

Impact of Information & Communication Technology on Education: Evidence from Select Academic Institutions in West Bengal, India

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ABSTRACT

Information & Communication Technology (ICT) is recognized as one of the most efficient means for social transformation which can be considered as an effective tool for education. Due to the rapid advancement of internet facilities, mobile phones, laptops and other modern technology oriented devices, today's world is going digitalized more rapidly. As technology dominates modern life so there is an emerging need to use ICT in education, commonly known as 'Digital Education'. Digital Education is nothing but learning assisted by technology, where learning is not restricted within the four walls of a classroom but it can be expanded throughout the world due to the intimation of upgraded technologies in learning. Recently, 'digital technology in the classroom' (DTC) not only promotes active learning and knowledge creation but also allows remote communication and sharing of information among teachers and learners in distant physical classroom locations. But, digital education has both advantages and disadvantages. The Dialogic practice (where students are actively engaged in a conversation from where learning emanates) and Emancipatory practice of digital education (where the ideas of students go beyond the learning that teachers recommend) acts an effective role in massive development of education as the students can gather knowledge beyond formal education for an elaborative understanding. But the digital technology creates a separation between those who are able to access internet facilities and those that cannot, which is termed as 'Digital Divide'. Further, several problems like inconsistent internet connections, destroy of social skills due to lack of oral communication, etc. hinders the growth of digital education.

Digital education is in the progress of development in India. Central government is funding to the educational institute for introducing ICT tools through various agencies. The Department of Education, Government of West Bengal has introduced Computer Based Learning (CBL) system titled 'KYAN' (Vehicle of Knowledge) through West Bengal Electronics Industry Development Corporation Ltd (WEBEL). These kind of technology is used for the purpose of sustainable development in education and connect the digital gap. The present scenario of introducing digital technologies in educational institute in West Bengal is not well established. The present study is limited to highlighting the overall scenario of using ICT in education and analyzing the real fact of using digital technologies in selected colleges in West Bengal. This study is developed based on both primary and secondary sources of information. From the study it is revealed that there is a great need for developing digital education in the educational institute using ICT tools so that the knowledge gathering can be possible at any time and every time at any corner of the world in the competitive age.

Keywords

Digital education, active learning, Digital Divide, Dialogic and Emancipatory practice.

Introduction

Due to the rapid advancement of internet facilities, mobile phones, laptops and other modern technology oriented devices, today's world is going digitalized more rapidly. As technology dominates modern life so there is an emerging need to use Information and Communication Technology (ICT) in education, commonly known as 'Digital Education'.

ICT has the capacity to provide higher quality interactive potentiality for users in developing

their individual, intellectual and creative ability. Digital Education is nothing but learning assisted by technology, where learning is not restricted within the four walls of a classroom but it can be expanded throughout the world due to the intimation of upgraded technologies in learning.

Recently, 'digital technology in the classroom' (DTC) not only promotes active learning and knowledge creation but also allows remote communication and sharing of information among

teachers and learners in distant physical classroom locations.

The traditional educational system faces several problems as all activities in the organization are carried out manually, teachers have to maintain all the chapter contents to be taught in the class on paper, attendance records are maintained in register book, etc. This digitalized education system will help not only the educational institution but also teachers, students and their parents. Students can get all the notes and related

contents taught in the class and view class history online from home. They can also attend extra-curricular classes and tutorial classes available in school itself by means of tutorial modules with very low cost.

Hence, the latest trends in digitalized education system include both adaptive as well as collaborative learning where each student is engaged by practicing, sharing things and gaining knowledge in a collaborative environment.

Literature Review

Harrison et al (2004) analyzed statistically that there is a positive correlation between higher levels of ICT use with school achievement in subjects like English, mathematics, science, modern foreign languages and design technology. Somekh et al (2007) also recognized a link between high levels of ICT use and improved school performance. He found that the rate of improvement in tests in English at the end of primary education was faster in ICT Test Bed education authorities in England than in equivalent comparator areas.

Jewitt et al (2011) in his study mentioned that the usage of digitalized resources provides learners more time for active learning not only in classrooms but also outside the classrooms, and

also provide self-directed spaces like blogs and forums. Such resources provide safer spaces for formative assessment and feedback.

Higgins et al (2012) found that digital learning has a greater impact on writing than on reading or spelling.

Hess (2014) analyzed the impact of using e-readers and e-books in the classrooms among 9-10 year olds in the USA. Such e-books were used in daily teacher-led guided reading groups, replacing traditional print books in these sessions. The study concluded with a significant difference in reading assessment scores for the group using e-readers. Scores improved for both male and female learners and there is a decreasing trend in the gap between males and females.

Objectives of the Study

The study is limited with the use of technology in the educational institute. Use of technology may vary depending on the types of institution. The present study is confined with the general degree college of West Bengal. The main objectives of the study are:

- I. To give a brief concept of Digital Education.
- II. To highlight the overall scenario of using ICT in education.
- III. To examine the impact of Digital Education on Stock Performance of Information Technology companies in the Post- COVID 19 scenario.

IV. To analyze the real fact of using digital techniques in selected colleges in West Bengal.

V. To suggest the futuristic views of Digital Education.

Methodology

Selection of Sample:

There are 77 colleges under University of Calcutta within Kolkata. Among all such colleges within Kolkata, 50% of them i.e. 40 (rounded off) have been taken into consideration for the study.

Data Collection:

This study is based on both secondary and primary sources of information. The secondary data has been collected mainly from the internet sources from the websites of, Department of Education - Government of West Bengal, University of Calcutta, several reputed journals, publications, etc. Primary data have been collected from 5 students of Part III in each of the selected sample of colleges (i.e., total 200 students have been selected as respondents from 40 colleges for this study). Opinions have been taken from them for developing the study.

Statistical tools used:

Data have been segregated into different parts from different viewpoints considering the opinion of the students. Mean and averages of the information so collected have been used and shown in the tabular form. Various charts and diagrams like bar charts, line diagrams, pie charts, etc. have been used to represent the data.

About Digital Education:

Digital Education is nothing but learning assisted by technology, where learning is not restricted within the four walls of a classroom but it can be expanded throughout the world due to the intimation of upgraded technologies in learning. Digital learning is more than just providing students with a laptop that requires a combination of technology, digital content and instruction. It is a dynamic system that fully digitizes the traditional education system. The traditional educational system faces several problems as all activities in the organization are carried out manually, teachers have to maintain all the chapter contents to be taught in the class on paper, attendance records are maintained in register book, etc. This digitalized education system will help not only the educational institution but also teachers, students and their parents. It will prove to be beneficial in the admission procedure of students, scheduling of class lectures and routines, managing library activities, managing teachers as well as students' notes and all other such sort of activities. All related information will be available to the students and parents as well as teaching and non-teaching staffs both inside and outside the school campus through web facility. Students can get all the notes and related contents taught in the class and view class history online from home.

They can also attend extra-curricular classes and tutorial classes available in school itself by means of tutorial modules with very low cost.

Hence, the latest trends in digitalized education system include both adaptive as well as collaborative learning where each student is engaged by practicing, sharing things and gaining knowledge in a collaborative environment.

Overview of using ICT in Education in India:

India holds an important place in the global education industry with nearly more than 36,000 higher education institutes. India has become the second largest market for digital learning after the USA. Its distance education market is expected to grow at a Compound Annual Growth Rate (CAGR) of around 34% during 2013-14 to 2017-18. The aim of the Central government to raise its current gross enrolment ratio to around 30% by 2020 accelerates the growth of the distance education in Indian economy.

The higher education system in India has undergone rapid expansion. Recently, the Indian higher education system is the largest in the world, creating enrollment to over 70 million students. Presently, the higher education sector faces an expenditure of over Rs 46,200 crores that is expected to grow at an average annual rate of over 18% to reach Rs 2,32,500 crores in next 10 years. As per the data of the Department of Industrial Policy and Promotion (DIPP), the total amount of inflow of Foreign Direct Investments (FDI) into the education sector in India stood at US\$ 1,256 million from April 2000 to March 2016.

A lot of initiatives have been taken up by the Government and many multinational companies for sustainable development of digital education in India. The training and skills development firm NIIT has come into partnership with USA based edX for offering online courses from leading international universities including MIT and Berkeley to around 5 lakhs people over the next three years. Again, Tata Trusts (part of the Tata Group) has made a strategic partnership with web-based free learning portal, Khan Academy for providing free education to any person, anywhere throughout India. Not only this, EdCast, a technology education start-up based in Silicon Valley, has planned to invest up to US\$ 50 million

in education based on ICT tools and made tie-ups with around 500 educational institutions in order to build digital content and curriculum for educational institutions of India.

Further, the Union Budget 2016-17 has also made certain provisions for the improvement of the education sector. The Government of India has announced plans to digitize academic records such as degrees, diplomas, mark sheets, migration certificate, etc. from secondary to tertiary-level institutions into a National Academic Depository (NAD). The main objective of the government is to integrate technology in digitalized learning for both rural and urban people. It has also aimed to launch more and more digital literacy centres for covering more than six crores rural households. Not only that, it has also taken initiatives to skill around one crore youths within next three years under the Pradhan Mantri Kaushal Vikas Yojna (PMKVY)

Thus, it can be clearly mentioned that modern technology is the only instrument for creating a positive impact on education, with solving the big educational problems of the economy India. Thus, there is a great need of creating a digitalized education environment with the help of modernized technology for helping students learn better and teachers teach better.

Impact of Digital Education on Stock performance of Information Technology companies in the Post COVID 19 scenario:

COVID 19- the contagious disease caused by coronavirus, has been considered as global pandemic by World Health Organization, which disrupted the socio-economic conditions of global citizens enormously. It also led to a global recession since the beginning of 2020, with a massive crash in the global business scenario on account of production curtailment throughout the whole world. Rising economic stress has led to a drastic decline in demand for both manufacturing and services sector on account of the urge of social distancing.

Among all the other sectors of Indian economy, COVID 19 has a gigantic negative influence on the education sector. The Central and State Governments announced lockdowns throughout

the country in the month of March 2020. On account of the reliance only on traditional chalk and talk methods of teaching-learning procedures, almost all the public schools and colleges started facing massive problems in completing their regular courses. Here, comes the need of Digital Education, which has been started by some of the renowned Private Schools, Colleges and Universities. Since the outbreak of COVID 19, the stock markets have been experiencing a severe dampening effect both in the Indian as well as global markets. BSE SENSEX and NIFTY50 (the two benchmark indices of Indian Stock market) slumped down by around 16000 points and 4500 points within February – March 2020.

Figure 1: Movement on SENSEX in Post-Covid 19 era (in base points)



(Source:

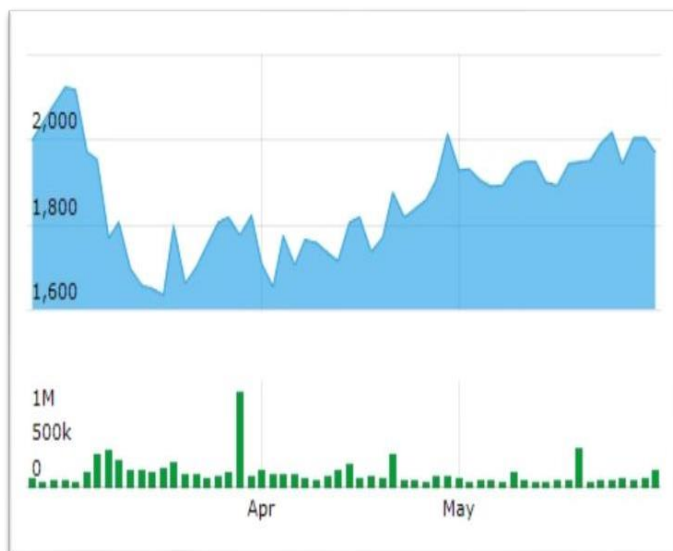
<https://www.bseindia.com/sensex/code/16/>)

Alike other sectors, the Information Technology (IT) sector comprising of major companies like Tata Consultancy Services (TCS), Infosys, 3i Infotech Limited, HCL Technologies, Wipro, etc. faced similar dampening effects on account of negative investor attitude for their lack of clarity of the immediate way forward.

However, on the account of the advancement of Digital Learning in the scenario of pandemic COVID 19, some of the major IT companies became the market gainers with a very short time span.

TCS, the largest revenue generating IT company (as per NASSCOM-The Trade Association of Indian IT BPM industry), retained itself as the major IT market gainer, thereby imparting the platform of Digital Learning through its renowned online learning software TCS ion.

Figure 2: Stock price performance of TCS during March-May 2020 (in base points)



(Source: <https://www.bseindia.com/stock-share-price/tata-consultancy-services-ltd/tcs/532540/>)

Due to increased demand of Digital Education, just like TCS, all other IT companies also started providing online learning platforms. This led to an improvement of stock performance from around 11,600 points to 13,500 points for both S&P BSE IT index and NIFTY IT index.

Thus, modern technology is the only instrument for creating a positive impact on education, with solving the big educational problems of the economy India. Thus, there is a great need of creating a digitalized education environment with the help of modernized technology by all educational institutions for helping students learn better and teachers teach better.

The Real Fact of using Digital Techniques in Select Colleges in West Bengal

Table 1: ICT tools available

Area covered	Number of colleges
Less than 20%	19

20% - 50%	11
50% - 80%	6
80% - 100%	4

(Source: Primary data survey)

From the given sample of 40 colleges, it is observed that 19 colleges have less than 20% of the ICT tools available and only 11 colleges have availability of 20% - 50% ICT tools. Only 4 colleges has 80% -100% of ICT tools for serving digitalized education.

Table 2: Ratio of ICT tools and number of rooms

Number of rooms	Number of colleges
Less than 20%	19
20% - 50%	15
50% - 80%	4
80% - 100%	2

(Source: Primary data survey)

From the given table, it is observed that 19 colleges have ICT tools in less than 20% of the rooms and only 15 colleges have smart teaching facilities in 20% - 50% of rooms. Only 2 colleges have ICT tools in 80% -100% of their rooms.

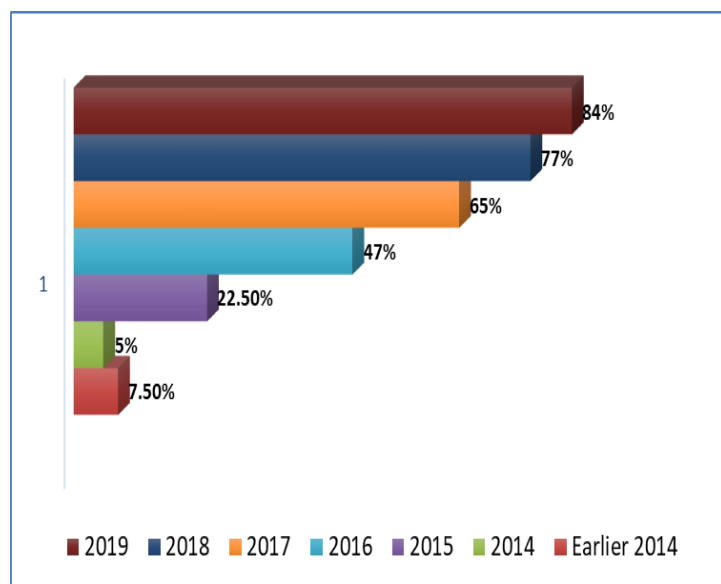
Table 3: percentage of teachers using ICT tools

Number of teachers	Number of students
Less than 20%	19
20% - 50%	15
50% - 80%	4
80% - 100%	2

(Source: Primary data survey)

From the given table, it can be stated that most of the teachers in colleges do not use smart classes facilities in teaching. 119 students mentioned that less than 20% of the teachers use ICT tools while teaching in classrooms. Only 9 students mentioned that 80%-100% of their teachers use ICT tools while teaching in class.

Figure 3: Time of introduction of ICT tools



(Source: Primary data survey)

From the above figure, it can be stated that 65% of the colleges introduced ICT based learning in 2016 and around 7.5% of the colleges introduced digitalized education before 2014. Only 5% of the colleges introduced digital education in 2014 that has increased to 22.5% in 2015.

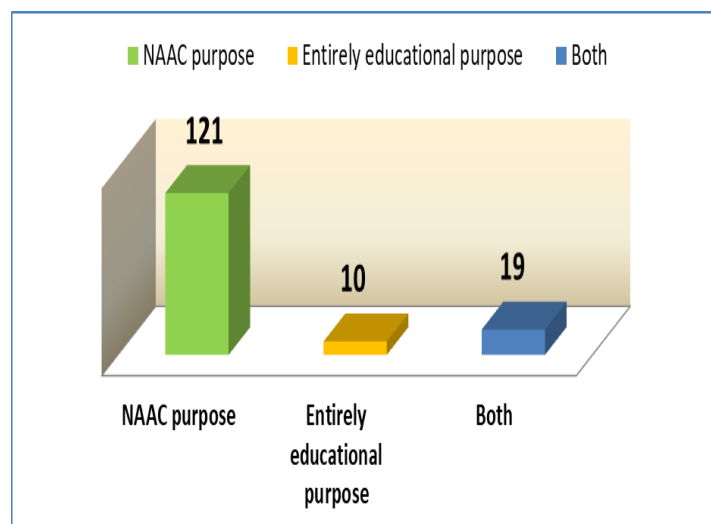
Table 4: Last NAAC assessment held

Year	Number of colleges
2019	34
2018	20
2017	11
2016	7
2015	4
2014	3
Earlier 2014	6

(Source: Primary data survey)

The above table states that most of the colleges have their NAAC (National Assessment and Accreditation Council) assessments in 2016 (27 colleges) and only 6 colleges have their NAAC assessments earlier 2014, and only 4 of them are in 2015.

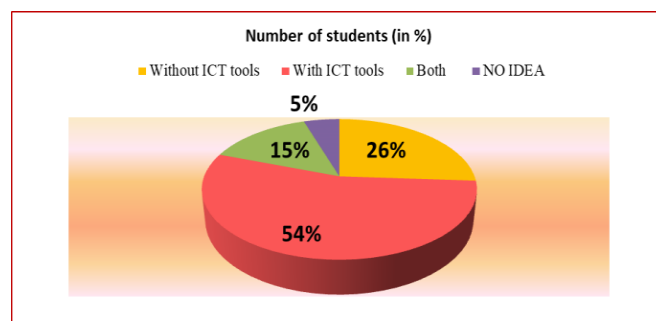
Figure 4: Opinion on installation of ICT tools in classrooms



(Source: Primary data survey)

From the above figure, it can be mentioned that most of the colleges introduced ICT based learning for getting higher gradation in the assessment of NAAC. 121 students mention that their colleges have introduced e-learning for NAAC purpose, while only 10 students mention that their colleges are using ICT tools for educational purpose only.

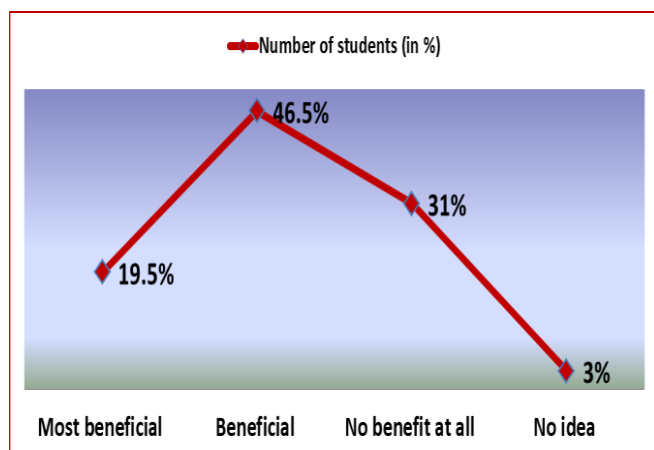
Figure 5: Preference of teaching



(Source: Primary data survey)

The above figure states that 54% of the students prefer to be taught using ICT based education. Only 26% of the students prefer that their teachers should continue traditional teaching methods like chalk and talk, and only 15% students prefer both traditional learning and e-learning. But 5% of the students have no idea about such preferences.

Figure 6: Opinion on the benefits of ICT tools



(Source: Primary data survey)

From the above figure, it can be stated that most of the students find this digitalized education to be beneficial for having an in-depth understanding while learning (46.5%). 31% of the students gave their opinion for having no such benefit in having ICT based learning and only 19.5% students thought e-learning to be most beneficial for their studies.

Table 5A: Attendance percentage of students

Number of colleges	Number of students
Less than 20%	36%
20% - 50%	43%
50% - 80%	53%
80% - 100%	67%

(Source: Primary data survey)

Table 5B: Attendance rate

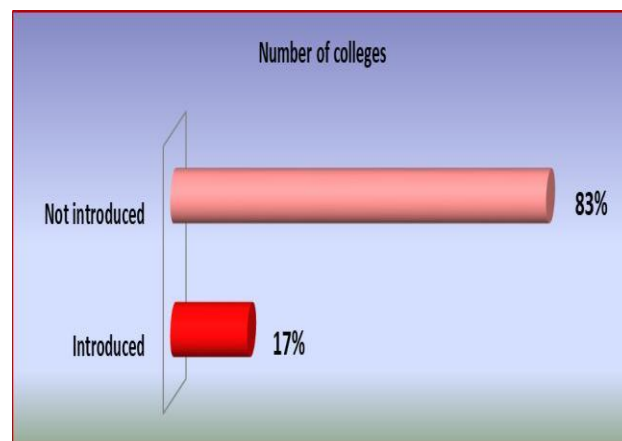
In case of:	Number of students
Before introducing ICT tools	53%
After introducing ICT tools	69%

(Source: Primary data survey)

From the above tables, it can be mentioned that ICT based learning has a dramatic impact on attendance of students. The attendance percentage is only 36% for the colleges having less than 20%

of ICT tools, but that was higher (67%) in colleges using mostly all types of ICT tools. Further, it can also be mentioned that the attendance rate has increased from 53% to 66% when the colleges provide ICT based learning facilities.

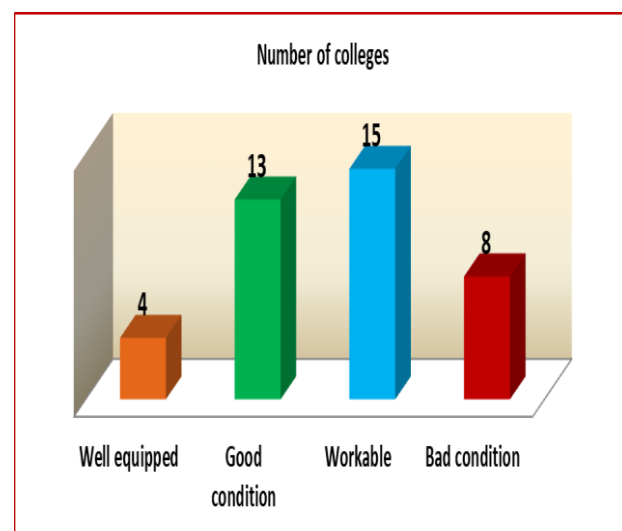
Figure 7: Use of video conferencing



(Source: Primary data survey)

It can be highlighted from the above figure that most of the colleges still not introduced ICT based learning facilities (83%). Only 17% of the colleges have introduced such learning facilities.

Figure 8: Opinion about computer labs



(Source: Primary data survey)

From the given figure, it can be mentioned that among the selected sample of 40 colleges, most of the colleges have just workable computer labs (15). But only 4 colleges have well equipped with advanced technology oriented computer labs, while the computer labs of around 8 colleges are in a worse condition. This highlights that a lot of

improvement of computer labs is required with the help of smart technology in most of the colleges.

Conclusions and Recommendation

From the study it can be concluded that:

- Most of the colleges are not well equipped with the digital technology for education purpose.
- Ratio of ICT tools and number of rooms is very low.
- Proportion of computers for laboratory purpose and the number of students are very low.
- Most of the colleges have introduced ICT tools in the current academic year.
- A large amount of students prefer the teaching with PowerPoint presentation or any digital form.
- Although the attendance rate of the students have not increased much.
- Video conferencing is not in use in most of the colleges.

The present study suggests that:

- ❖ The grants received from various sources may be used for installing ICT techniques in the colleges.
- ❖ It should not be limited to serve the purpose of NAAC visit.
- ❖ Video conferencing policies and procedures may be introduced for the development of distance learning education within the present structure of education system.
- ❖ Technical supporting system like high speed internet access facilities must be there in computer lab.

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